

FM 23-65

WAR DEPARTMENT FIELD MANUAL

man

BROWNING MACHINE GUN, CALIBER .50 HB, M2

WAR DEPARTMENT • NOVEMBER 1944

placed in grooves provided. Loading is performed by the operation of the loading handle which, when pushed forward to the stop, loads ammunition to correct depth in the links. The machine has a delinking attachment.

41. Hangers

a. FOR AMMUNITION. Ammunition hangers are used to carry two ammunition chests in pack transport. Two hangers, one on each side, are secured to the pack saddle. Ammunition chests are held in hangers by straps with a quick release device.

b. FOR RECEIVER. The machine gun receiver with pintle and elevating mechanism attached is carried on the left side of the pack saddle. Two clamping hinges provide for quick release of the load. The upper part of the hanger hooks over a hanger bar, and is held down by straps on the lower part of the hanger that buckle to the saddle.

c. FOR BARREL AND TRIPOD. The upper part of the hanger for the barrel and tripod hooks over the hanger bar on the right side of the saddle and is held down by straps buckled to the bottom bar of the saddle. The barrel and tripod are fastened in the hanger by straps provided with quick releases.

Section VII. AMMUNITION

42. Types

The principal classifications of ammunition are:

- Ball, for use against matériel targets.
- Tracer, for observation of fire and incendiary purposes.
- Armor-piercing, for use against lightly arm-

ored vehicles, concrete shelters, and similar bullet resisting targets.

d. Armor-piercing incendiary, for use against lightly armored vehicles and trailers to set them afire.

e. Blank for simulated firing.

f. Dummy, for training.

Armor penetration .50 cal. M2 AP projectile at various ranges and for angles of impact at 90° and 70°.

Penetration	Approximate Range	
	90°	70°
1".....	100	...
¾".....	400	200
½".....	700	500

Penetration values on homogeneous armor plate is slightly higher.

43. Identification

a. BOX MARKINGS. The contents of original boxes are readily identified by markings and lettering on the box.

b. AMMUNITION MARKINGS. Color painted on the tips further identify the various types of ammunition. The following colors are used:

BROWNING MACHINE GUN CALIBER .50 HB, M2

**HEADQUARTERS
DEPARTMENT OF THE ARMY**

DISTRIBUTION RESTRICTION—Approved for public release; distribution is unlimited.

c. **Care, Handling, and Preservation.** Exercise care to prevent ammunition boxes from becoming broken or damaged. If they do, repair them immediately. Transfer all original markings to the new parts of the box. Do not open ammunition boxes until the ammunition is to be used. Ammunition removed from the airtight container, particularly in damp climates, is likely to corrode. Protect the ammunition from mud, sand, and water. If the ammunition gets wet or dirty, wipe it off at once with a clean, dry cloth. Wipe off light corrosion as soon as it is discovered. Turn in heavily corroded cartridges. Do not expose ammunition to the direct rays of the sun. If the powder is hot, excessive pressure may be developed when the weapon is fired. Do not oil or grease ammunition. Dust and other abrasives that collect on greasy ammunition are injurious to the operating parts of the gun. Moreover, oiled cartridges produce excessive chamber pressure. Do not fire dented cartridges, cartridges with loose bullets, or otherwise defective rounds.

d. **Storage.** Small-arms ammunition is not an explosive hazard, but under poor storage conditions it may become a fire hazard. Store ammunition of all classes away from radiators, hot water pipes, and other sources of heat. Whenever possible, store ammunition under cover. If it is necessary to leave ammunition in the open, keep it at least 6 inches off the ground and covered with a double thickness of tarpaulin. Place the tarpaulin so that it gives maximum protection and allows free circulation of air. Dig suitable trenches to prevent water from flowing under the ammunition pile.

e. **Miscellaneous Data.** Table 1-5 lists the maximum penetration in inches for an armor-piercing cartridge fired from the 45-inch barrel (muzzle velocity, 2,935 feet per second), which in some cases may enhance the leader's selection of targets to engage.

MATERIAL	INCHES AT:		
	200 METERS	600 METERS	1,500 METERS
Armor plate (homogeneous)	1.0	0.7	0.3
Armor plate (face-hardened)	0.9	0.5	0.2
Sand (100 pounds dry weight/cubic feet)	14.0	12.0	16.0
Clay (100 pounds dry weight/cubic feet)	28.0	27.0	21.0

Table 1-5. Maximum penetration for armor-piercing cartridge.



MCTP 3-01C
(Formerly MCWP 3-15.1)

Machine Guns and Machine Gun Gunnery



US Marine Corps

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.



PCN 147 000017 00

	PROJ TYPE	PROJ DIA (MM)	PROJ WT(GM)	M.V. (FPS)	TOF(S) 1200M	TOF(S) 2500M	TGT MEAN RAD(MIL)	ARMOR PENETRATION (MM)		CARTRIDGE DIMENSIONS		
								500M	1200M	L (MM)	D (MM)	WT (GM)
M33	Ball	12.7	45.8	2810	2.6	7.7	0.4	8	4	137	21	119
M2	AP	12.7	45.8	2810	2.6	7.7	0.4	19	10	137	21	119
M8	APi	12.7	42.9	2910	2.5	6.9	0.4	16	8	137	21	114
M20	APIT	12.7	41.3	2910	2.7	7.8	0.5	21	11	137	21	111
M903 (SLAP)	APDS	7.7	22.6	4000	1.2	3.2	0.7	34	23	137	21	98

Maximum Range : 7600 Meters.

Figure 4-83. Ballistic Data.

MATERIAL	INCHES AT:		
	200 M	600 M	1500 M
Armor plate (homogeneous)	1.0	0.7	0.3
Armor plate (face-hardened)	0.9	0.5	0.2
Sand (100 lb dry w/cu ft)	14	12	16
Clay (100 lb dry w/cu ft)	28	27	21

Figure 4-84. Maximum Penetration for Armor-Piercing Catridge, M2 .50 Cal.



Figure 4-86. Ammunition Box.

MATERIAL	INCHES AT:		
	200 M	600 M	1500 M
Sand (100 lb dry w/cu ft)	14	12	6
Clay (100 lb dry w/cu ft)	28	26	21
Concrete	2	1	1

Figure 4-85. Maximum Penetration for Ball Cartridge, M2 .50 Cal.

4804. Ammunition Packaging

M2 .50 cal ammunition is packaged in a metal box containing 100 linked rounds. Each box of 100 rounds weighs approximately 35 pounds. See figure 4-86.

4805. Storage

Store ammunition of all classes away from heat sources; i.e., open flame, radiators, heaters, and hot water pipes. Ammunition should be stored under cover. If it is necessary to leave ammunition in the open, keep it at least 6 inches from the ground and covered with a double thickness of tarpaulin. Place the tarpaulin so it gives maximum protection and allows free circulation of air. Dig suitable trenches to prevent water from flowing under the ammunition pile.

The 12.7 mm **ammunition family**

12.7 mm MP NM140, 12.7 mm MP-T NM160, 12.7 mm AP-S NM173, (NM185)



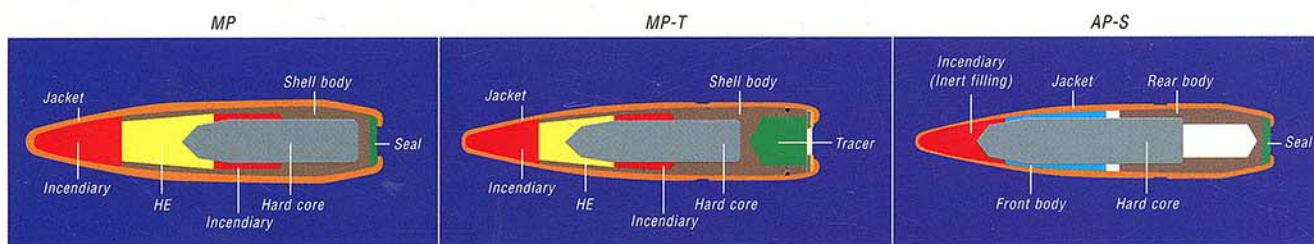
Nammo
NORDIC AMMUNITION COMPANY

The 12.7 mm ammunition family

12.7 mm MP NM140, 12.7 mm MP-T NM160, 12.7 mm AP-S NM173, (NM185)

Technical data:

Muzzle velocity: 920 m/s Chamber pressure: 450 MPa max Action time: 5 ms max Projectile weight: 43-47 g	MP NM140	MP-T NM160	AP-S NM173	NM185
PENETRATION	11 mm armour in 45° at 1000 m	11 mm armour in 45° at 1000 m	11 mm armour in 30° NATO at 1500 m	11 mm armour in 30° NATO at 1500 m
FRAGMENTATION	Approx 20 effective fragments after hitting 2 mm Dural	Approx 20 effective fragments after hitting 2 mm Dural	-	-
INCENDIARY EFFECT	Ignition of JP4 and JP8 fuel	Ignition of JP4 and JP8 fuel	-	-
ACCURACY, GRADE A, AT 550 M (MEAN RADIUS)	<15 CM	<25 CM	<15 CM	<15 CM
TRACER	-	Red tracer 50-1500 m	-	-
SAFETY	All types are safe in transport, storage and handling. Drop test from 15 m with safe firing after drop. Comply with requirements in NATO standards.			



Recent modifications to the 12.7 mm machine gun system have made it considerably more effective as an offensive and defensive weapon system. For example, the new "softmount" dramatically increases the accuracy with less than 18 kg of added weight. Furthermore, the new family of MULTIPURPOSE and ARMOUR PIERCING rounds (originally designed for the .50 cal M2 machine gun) have a unique penetration capability as well as extraordinary fragmentation and incendiary effects. This gives the overall gun system the equivalent firing power of a 20 mm projectile to include such targets as helicopters, aircrafts, light armour vehicles, ships, and light fortifications. The interior and exterior ballistic properties of the 12.7 mm projectile are exactly the same as the USA .50 caliber machine gun system. The cartridge case, propellant, primer, and projectile jacket are identical. However, it is the "Multipurpose Concept" that has been the reason for the overall international

success. Developed and produced at Nammo Raufoss AS since the early 1980's, this multipurpose concept combines the properties of low sensitive incendiary and explosive charges. This creates a highly effective projectile with a state-of-the-art pyrotechnically initiated fuze and a reliable ignition train after target impact. This highly effective armour penetrating round features delay function, fragmentation, fire starting capabilities, and provides other superior qualities that enables it to outperform the standard 12.7 (.50) caliber ammunition. Additionally, storage, handling, and operational firing satisfy all NATO safety standards.

The Raufoss 12.7 mm MULTIPURPOSE family of ammunition is the accepted standard by several NATO member countries. Nammo Raufoss AS teamed with OLIN Winchester, USA for the successful production of the MK 211 MOD 0 (MP NM 140) which is now qualified for use by the

US Army, Navy, Marines and Special Operations. The family consists of four (4) different and distinct rounds:

- MP NM140 (Multipurpose)
- MP-T NM160 (Multipurpose-Tracer)
- AP-S NM173 (Armour Piercing Super)
- AP-S NM185 (Armour Piercing Super - Inert)

All four rounds have the same weight and ballistic performance. Therefore they can be linked together with no adverse effect on the ballistics. Furthermore the MP and AP-S projectiles can be delivered in the extremely accurate Grade A configuration, making each an excellent choice as a sniper round against material targets.

Nammo

NORDIC AMMUNITION COMPANY

Medium Calibre Ammunition Division

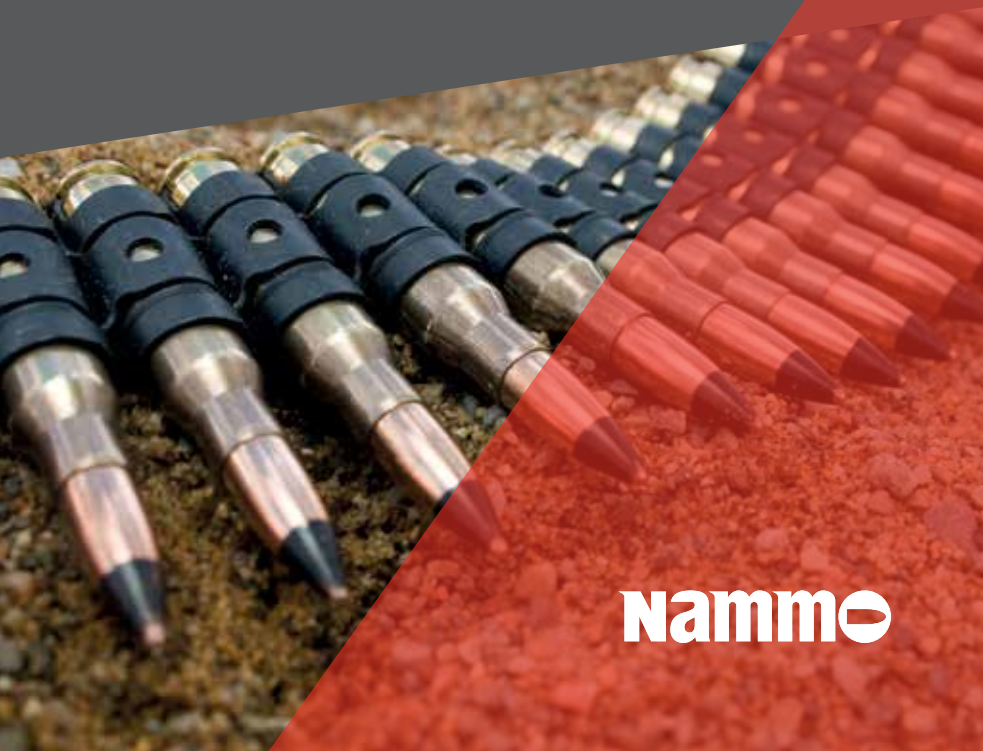
P.O. Box 162, N-2831 Raufoss

Tel.: +47 61 15 36 50, Fax: +47 61 15 22 50

www.nammo.com

NAMMO AMMUNITION HANDBOOK

Edition 5, 2018



Nammo

12.7 mm × 99 API (.50 cal)



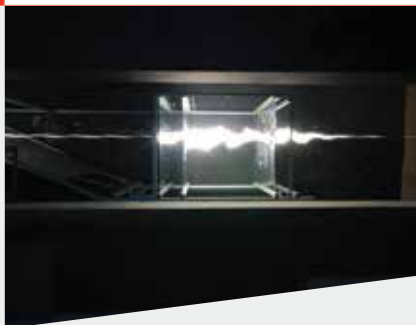
Mission

Armor Piercing/Incendiary round for machine gun use. The hard steel core together with the incendiary composition provide excellent performance against material/light armor targets.

Projectile weight	Approx. 42 g
Muzzle velocity	903 m/s
Max. dispersion at 550 m	SD ≤ 300 mm
Penetration	22 mm (321-375 HB) at 100 m
Tracer	N/A
Service temperature	-54°C to +63°C
Safety temperature	-54°C to +71°C

Status

Qualified for use in Browning M2 HB, M2 QCB, M2 Flex & Turret, M2 CIS-50 and M3A3. First Article approved by US Government. Equivalent to M8.



12.7 mm × 99 API-T (.50 cal)



Mission

Tracer round ballistically matched to the API round, for use in machine guns, which can be linked together with the API rounds.

Projectile weight	Approx. 40 g
Muzzle velocity	903 m/s
Max. dispersion at 550 m	SD ≤ 400 mm
Penetration	22 mm (321-375 HB) at 100 m
Tracer	Visible from 200 m to 1 500 m
Service temperature	-54°C to +63°C
Safety temperature	-54°C to +71°C

Status

Qualified for use in
Browning M2 HB, M2 QCB,
M2 Flex & Turret, M2 Manroy QCB
and M2 CIS-50. Equivalent to M20.



12.7 mm x 99 AP-S (.50 cal)

NM185 Grade A (Match Grade) & Grade B (Linked)



Mission

Armor Piercing round for extreme accuracy and high penetration capability against material targets. A large tungsten carbide penetrator provides excellent armor penetration (22 mm armored steel at 900 m). Targets range from light material to light armored vehicles.

Projectile weight	Approx. 47 g
Muzzle velocity	Approx. 893 m/s
Max. dispersion at 550 m	Grade A \leq 1.8 MOA/Grade B SD \leq 200 mm
Penetration	22 mm RHA @ 0° @ 900 m
Tracer/self destruct	N/A
Service temperature	-54°C to +63°C
Safety temperature	-54°C to +71°C

Status

Qualified in Browning M2HB, M2 QCB, M2 NM218, FNH M3M & M3P, CIS-50, Barrett M82, Barrett M107, AI AW-50, AI AX-50, AS-50, HECATE PGM, McMillan TAC-50, Rangemaster .50 and Steyr .50. More than 15 user countries in different applications. Combat proven.



12.7 mm x 99 APi-S (.50 cal)

NM173 Grade A (Match Grade) & Grade B (Linked)



Mission

Armor Piercing round for extreme accuracy and high penetration capability against material targets. A large tungsten carbide penetrator provides excellent armor penetration (22 mm armored steel at 900 m) with an incendiary/marker effect for spotting purposes. Targets range from light material to light armored vehicles.

Projectile weight	Approx. 47 g
Muzzle velocity	Approx. 893 m/s
Max. dispersion at 550 m	Grade A \leq 1.8 MOA/Grade B SD \leq 200 mm
Penetration	22 mm RHA @ 0° @ 900 m
Tracer	N/A
Service temperature	-54°C to +63°C
Safety temperature	-54°C to +71°C

Status

Qualified in Browning M2HB, M2 QCB, M2 NM218, FNH M3M & M3P, CIS-50, Barrett M82, Barrett M107, AI AW-50, AI AX-50, AS-50, HECATE PGM, McMillan TAC-50, Rangemaster .50 and Steyr .50. More than 15 user countries in different applications. Combat proven.

